भारतीय मानक
Indian Standard

IS 5742 : 2022

औद्योगिक स्क्रीन और स्क्रीनिंग से संबंधित शब्दों की शब्दावली

(पहला पुनरीक्षण)

Glossary of Terms Relating to Industrial Screen and Screening

(First Revision)

ICS 19.120

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March 2022 **Price Group 7**

Sieves, Sieving and Other Sizing Methods Sectional Committee, CED 55

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Sieves, Sieving and Other Sizing Methods Sectional Committee had been approved by the Civil Engineering Division Council.

A series of Indian Standards relating to Industrial screen and screening has been prepared. These include a large number of terms and symbols used for defining Industrial screen and screening. The extensive use of these terms and symbols had necessitated the preparation of this Indian standard.

This standard was originally published in 1970 in two parts as:

IS 5742 terms and symbols for sieve bottoms

Part 1 Woven and welded wire screens

Part 2 Perforated plates

In this revision, the following modifications have been made:

a) The erstwhile Part 1 and Part 2 of the standard have been merged thereby including terms and definitions relating to wire screens and perforated plates, at one place; and

b) The standard has been aligned with ISO 9045 : 1990 'Industrial screens and screening' to the extent required thereby also adding number of new terms and their definitions.

In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from the following publications:

ISO 9045 : 1990 Industrial screens and screening — vocabulary.

The composition of the Committee responsible for the formulation of this standard is given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GLOSSARY OF TERMS RELATING TO INDUSTRIAL SCREEN AND SCREENING

(First Revision)

1 SCOPE

1.1 This standard covers various terms, symbols and their explanations with illustrations relating to industrial screen and screening.

1.2 The terms and their definition given in this standard are grouped under the following heads:

a) Material to be screened;
b) Industrial screens;
c) The screening process; and
d) Products of screening.

2 TERMS AND DEFINITIONS

2.1 Material to be Screened

2.1.1 *Agglomerate* — Several particles adhering together.

2.1.2 *Angle of Repose* — Angle to the horizontal which a material will assume naturally when in a stationary pile.

2.1.3 *Bone Dry* — Material having no surface moisture.

2.1.4 *Bulk Density* — The mass in air per unit volume of bulk particulate material, including the voids within and between particles.

2.1.5 *Feed* — Material supplied to a screen for a screening process.

2.1.6 *Fines* — Particles smaller than a specified size.

2.1.7 *Inherent Moisture — contained moisture*: Liquid, usually water, held within a sample of a material, normally expressed as a percentage of the sample mass.

2.1.8 *Particle (Deprecated: Grain)* — Discrete element of the material to be screened regardless of its size.

2.1.9 *Particle Size; Sieve Size of a Particle* — Smallest sieve aperture through which a particle will pass if presented in the most favourable attitude.

2.1.10 *Percent Solids* — Ratio of dry solids to the total solid liquid mixture of material, expressed as a percentage by mass.

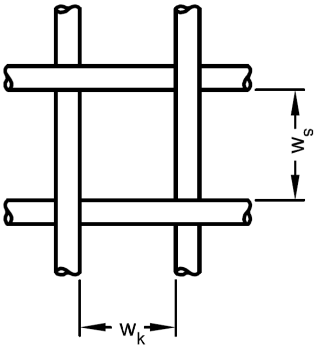
2.1.11 *Relative Density (Deprecated: Specific Gravity)* — Ratio of the mass in air of a solid particle of a given volume to the mass of an equal volume of water.

2.1.12 *Surface Moisture* — Liquid adhering to the exposed surfaces of the particles of a sample of material, normally expressed as a percentage of the sample mass.

2.2 Industrial Screens

2.2.1 *Amplitude* — Maximum displacement from the mean position in an oscillating motion. In the case of rectilinear motion it is half of the total movement; for elliptical motion it is half of the major axis of the ellipse.

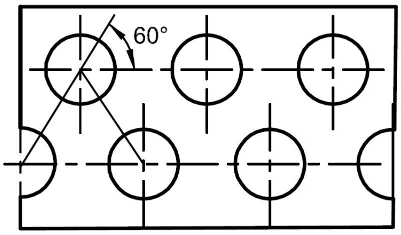
2.2.2 *Aperture Size* (*W, in Warp* $W_{k,}$ *In Weft* W_s) — Distance between two adjacent warp or weft wires measured across the projected level of the cloth.



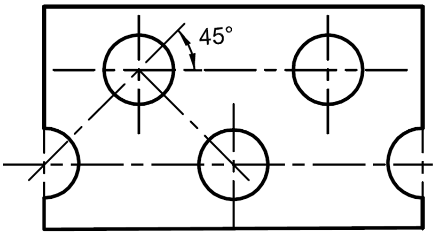
2.2.3 *Arrangement of Holes (in Perforated Plate)*

a) *Round holes*

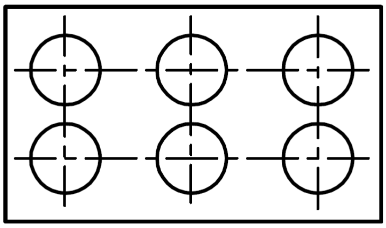
   1) In staggered rows (R_S):



   2) In diagonally staggered rows (R_d):

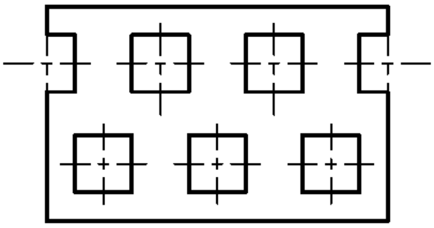


   3) In straight rows (R_P):

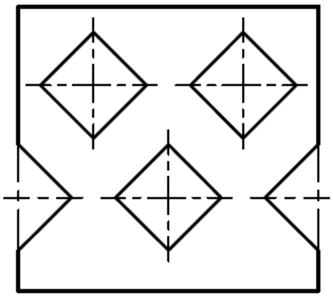


b) *Square holes*

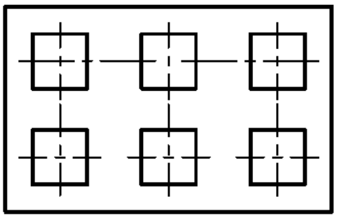
   1) Parallel (staggered) (Q_S):



   2) Diagonal (Q_d):

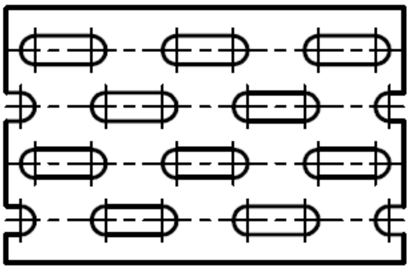


   3) In straight rows (Q_P):

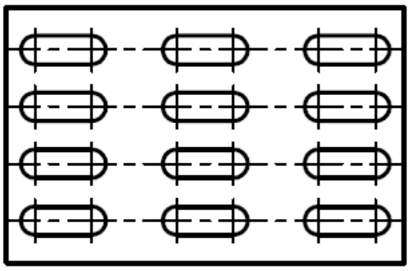


c) *Elongated holes*

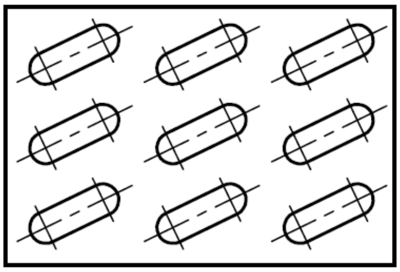
   1) Staggered with overlapping (LR_S):



   2) In straight rows (LR_P):

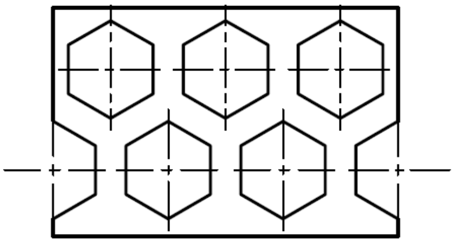


   3) Oblique (LR_o):



d) *Hexagonal holes*

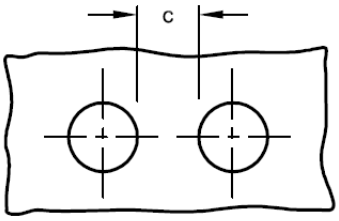
   1) Staggered:



2.2.4 *Backing Screen* — Coarse screen placed under a finer screening surface for support.

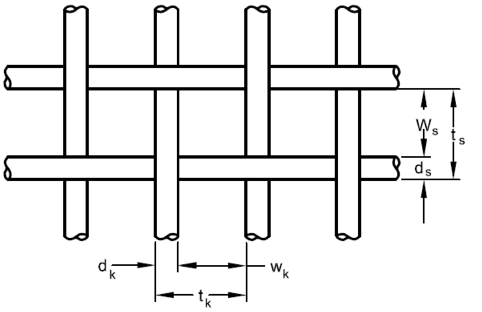
2.2.5 *Bar Screen* — Stationary inclined screen, comprising longitudinal bars, spaced at regular intervals, on to which the material to be screened is fed at the upper end.

2.2.6 *Bridge Width* (c) — Smallest unperforated length between two neighbouring holes measured on punch entry side in a perforated plate.



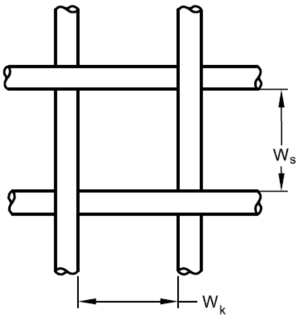
2.2.7 *Centre Distance Between Wires* — (*t,* in Warp t_k, in Weft t_s)

Sum of aperture and half the diameters of the adjacent wires, strands or threads of diameters d_1 and d_2, respectively ($W + d_1/2 + d_2/2$) measured across the projected level of the cloth. The simplified measurement is permissible where the cloth is made up of wires (strands, threads) of identical diameter d ($=d_1=d_2$).

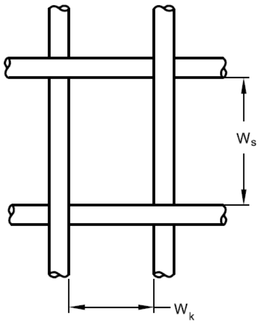


Following are the different types of mesh depending upon centre distance between wire:

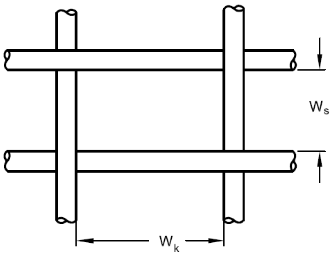
a) *Square Mesh* — Warp and weft wires (strands, threads) are the same distance apart $W_k = W_S$.



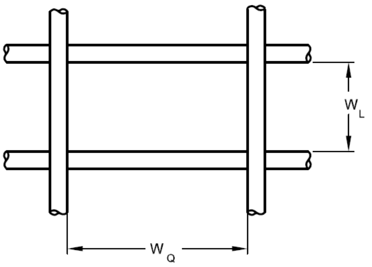
b) *Long or Slit Mesh* — Warp wires (strands, threads) closer together than weft wires (strands, threads) $W_k < W_S$.



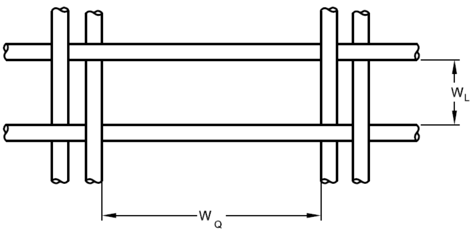
c) *Broad Mesh* — Warp wires (strands, threads) further apart than weft wires (strands, threads) $W_k > W_S$.



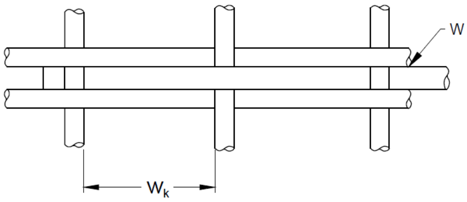
d) *Rectangle Mesh* (R_e) — Formed by plain wires or by wires crimped or stamped vertically to the cloth level, when $W_Q > W_L$ but $W_Q < 3W_L$.



e) *Slot Mesh* (S_p) — Formed by plain wires or by wires crimped or stamped vertically to the cloth level, when $W_Q > 3W_L$.



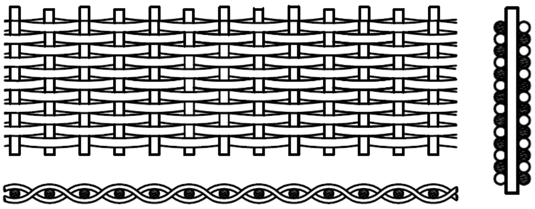
f) *Zero Mesh* — Warp wires (strands or threads) widely spaced weft wires (strands or threads) as closely spaced as possible (Dutch cloth) $W_S = 0$.



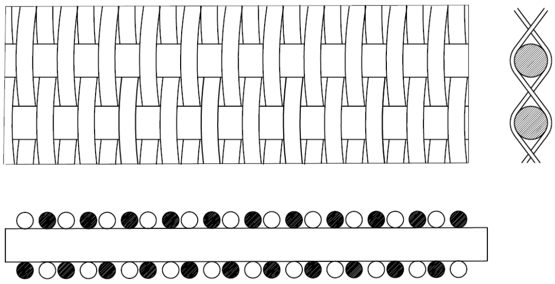
2.2.8 *Crimp* — Successive bends in a wire which result from preforming or weaving.

2.2.9 *Dutch Weave*

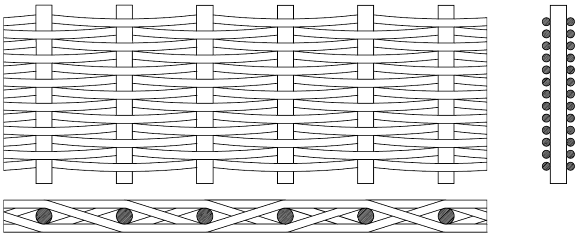
a) *Single plain Dutch weave*, also called raps, cordurey, Dutch or basket weave, or zero mesh (SPW).



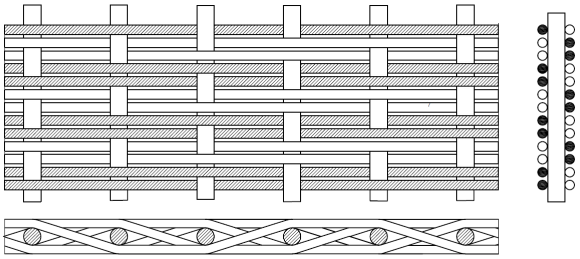
b) *Reverse plain Dutch weave*, similar to the SPW but woven 'the other way', that is, thinner and more warp wires, thicker and less weft wires (RPD).



c) *Dutch twill weave or double twill weave*, has twice the number of weft wires of the same diameter as the SPW cloth 'light-right' weave (DTW).



d) *BMT or 'OPEN DTW'* is a broad mesh twill weave woven similarly to the DTW cloth, but not 'light tight ; the weft wires are further apart and slightly irregular



2.2.10 *Eccentricity* — Maximum displacement from the mean position in a circular oscillating motion, for example: the radius of the circle.

2.2.11 *Edge Preparation* — The fabrication on the edges of a screen section for holding or tensioning purposes.

2.2.12 *End Tensioning* — Tensioning of the screen section parallel to the flow of the material on the screening surface.

2.2.13 *Equivalent Round Hole* — Diameter of the round holes in a perforated plate which will screen similarly to a perforated plate or a woven wire cloth with specified square apertures.

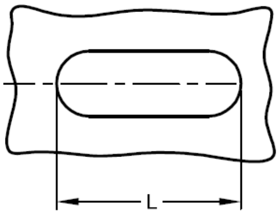
2.2.14 *Fixed Screen*; *Static Screen* — Stationary inclined screen used to remove a proportion of the fines from a dry feed or a proportion of the liquid and the fines from a pulp or slurry, by force of gravity.

2.2.15 *Frequency* — For vibrating screen, the number of oscillations made by the screen per unit of time, expressed in hertz (Hz).

2.2.16 *Grizzly* — Rugged screen comprising fixed or moving bars, discs, or shaped tumblers or rollers, normally used for screening comparatively large particles, for example: greater than 100 mm.

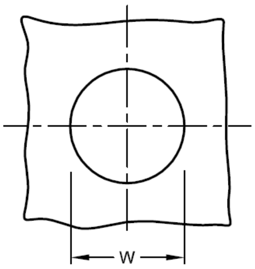
2.2.17 *Guard Screen* — Screen used to prevent the entry into a machine of coarse particles which might interfere with its operation.

2.2.18 *Hole Length* (l) (*in Perforated Plate)* — Longest dimension of the hole.

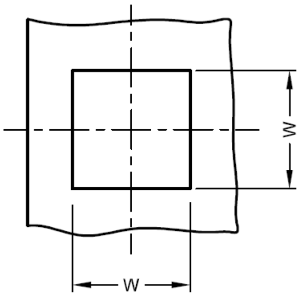


2.2.19 *Hole Width (W) (in Perforated Plate)*

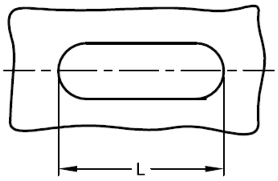
a) *For round holes* — Diameter of the perforation.



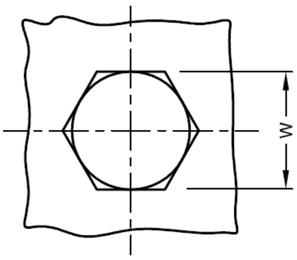
b) *For square holes — Length of the side of the hole.*



c) *For elongated holes* — Smaller dimension of the hole.



d) *For hexagonal holes* — Diameter of the inscribed circle.



2.2.20 *Hook* — Metal edge used to stretch and/or to fasten the screen section.

2.2.21 *High Speed Screen* — Inclined screen, with a rectilinear or circular oscillating motion, normally operated at a frequency greater than 20 Hz.

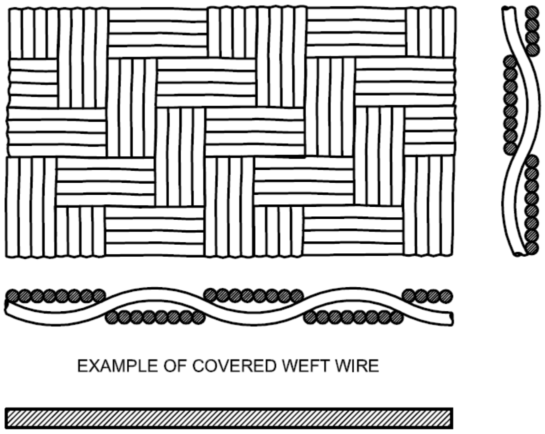
2.2.22 *Horizontal Screen* — Vibrating screen with a motion which is substantially in a straight line in the vertical, normally installed horizontally, but may be inclined up to 8°.

2.2.23 *Inclined Screen* — Vibrating screen with a rectilinear or circular oscillating motion, normally installed at an angle between 10° and 36°.

2.2.24 *Mesh Count* — Number of apertures per unit of linear measure in a woven wire cloth or wire screen.

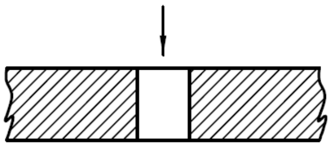
2.2.25 *Multiplex*

Twill weave, 4 shaft, multiple strands in warp and weft, left lay multiplex

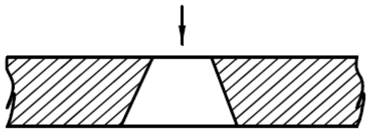


2.2.26 *Passage Cross Section* — The cut made perpendicular to the plane of sieving through the middle of a hole in a perforated plate.

a) *Parallel*



b) *Conical*



2.2.27 *Percentage Open Area*

a) For woven wire cloth and wire screens, the ratio of the total area of the apertures to the total area of the cloth or the screen.

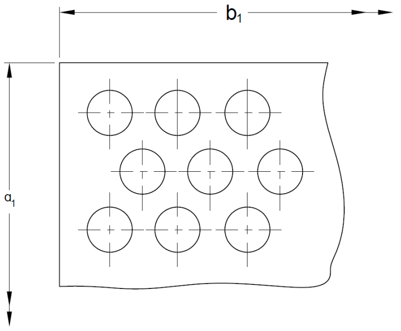
b) For perforated plate, the ratio of the total area of the holes to the total area of the perforated part of the plate (excluding any non-perforated parts).

2.2.28 *Perforated Plate* — Screening surface consisting of a plate with uniform holes in a regular arrangements.

2.2.29 *Perforated Plate Side*

a) Length of the side of the perforated plate in the direction of the larger hole spacing (a_1).

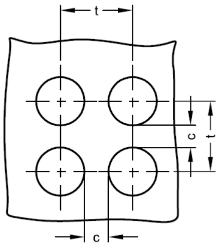
b) Length of the side of the perforated plate in the direction of the smaller hole spacing (b_1).

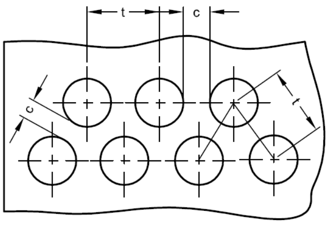


2.2.30 *Pitch (of Hole in Perforated Plate)* — Distance between corresponding points of two adjacent apertures in a woven wire cloth, a wire screen or a perforated plate. Following are the type of pitch:

a) *For round holes* (t) — Distance between centre of two neighbouring holes.

$$t = c + 2\frac{W}{2} = c + W$$

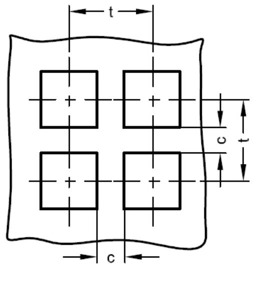


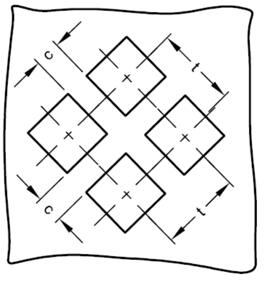


b) *For square holes* (t):

1) *Straight and diagonal rows* — Distance between centres of two neighbouring square holes.

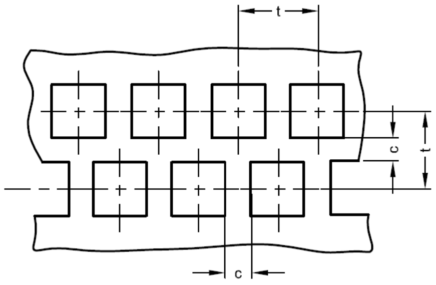
$$t = c + W$$





2) *Parallel rows of staggered hole* — Distance between the centres of two neighbouring square holes or distance between centres of two rows of square holes.

$$t = c + W$$



c) *For elongated holes*

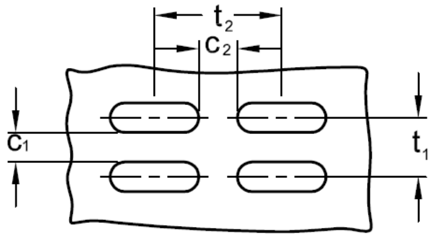
1) *Straight rows of holes*

i) *Transverse pitch* (t_1) — Distance between centres of two neighbouring elongated holes, measured along the line perpendicular to their longitudinal axis.

$$t_1 = c_1 + W$$

ii) *Longitudinal pitch* (t_2) — Distance between centres of two neighbouring elongated holes along their longitudinal axis.

$$t_2 = c_2 + I$$



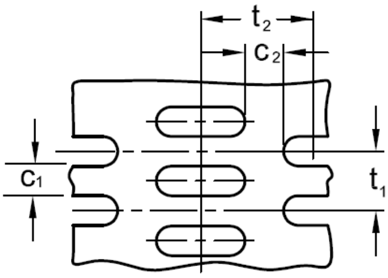
2) *Staggered holes (non-overlapping)*

i) *Transverse pitch* (t_1) — Distance between centres of two neighbouring elongated holes, measured transverse to their longitudinal axis.

$$t_1 = c_1 + W$$

ii) *Longitudinal pitch* (t_2) — Distance between centres of two neighbouring, staggered elongated holes rows, measured along the longitudinal direction of the holes.

$$t_2 = c_2 + I$$



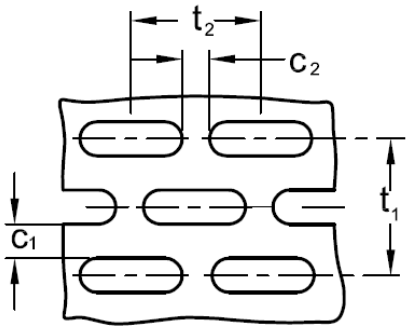
3) *Staggered holes (overlapping)*

   i) *Transverse pitch* (t_1) — Distance between centres of two non-staggered elongated holes, measured perpendicular to the longitudinal axis of the holes without considering the staggered hole in between.

$$t_1 = 2c_1 + 2W$$

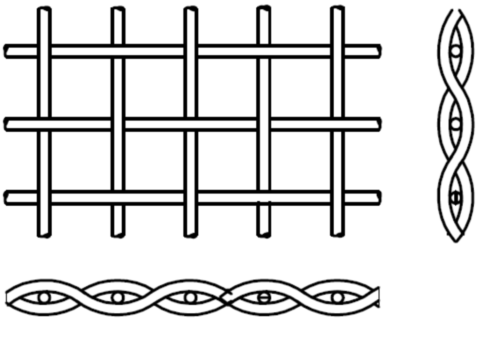
   ii) *Longitudinal pitch* (t_2) — Distance between centres of two neighbouring elongated holes, measured along their longitudinal axis.

$$t_2 = c_2 + I$$

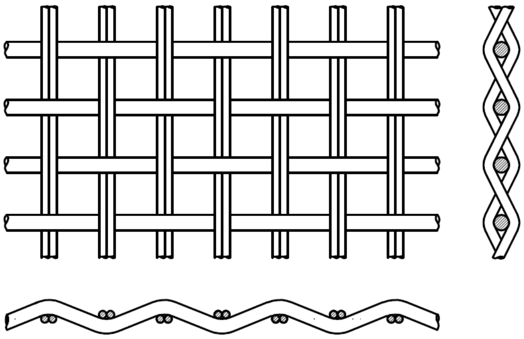


2.2.31 *Plain Weave* — Weave in which every warp wire crosses alternately above and below every weft wire and vice versa. Following are the types of plain weave:

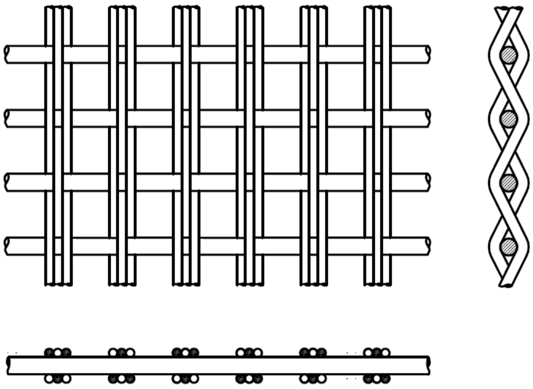
a) *Plain weave*



b) *Plain weave, double warp*

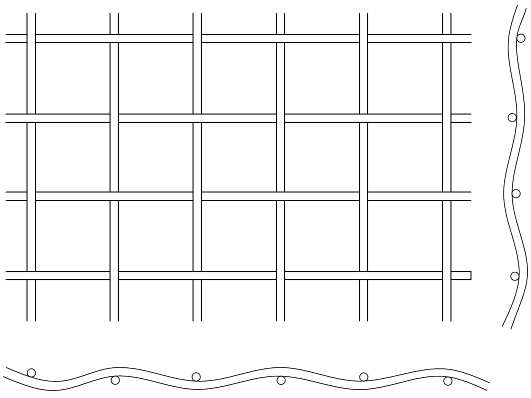


c) *Plain weave, triple warp*

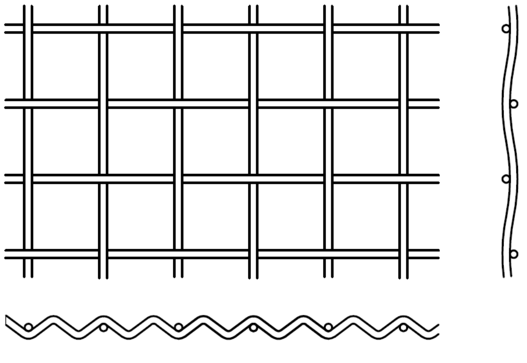


2.2.32 *Plain Weaves, Woven with Precrimped Wire*

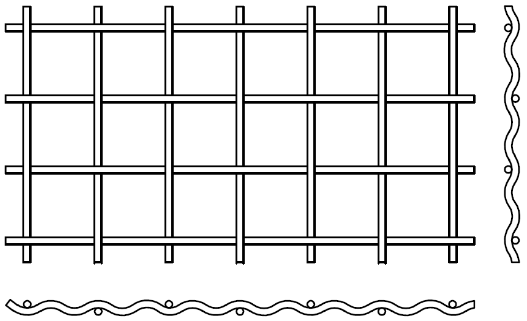
a) *Form A — Double crimp*



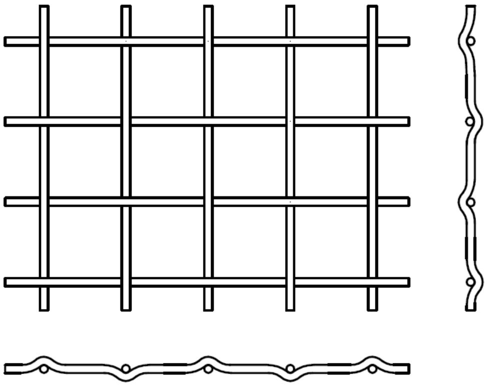
b) *Form B — Single intermediate crimp*



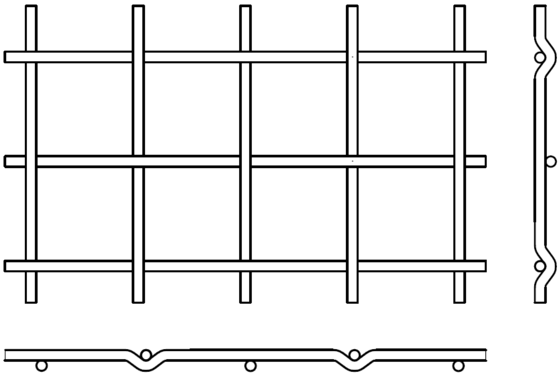
c) *Form C — Double intermediate crimp*



d) *Form D — Lock crimp*



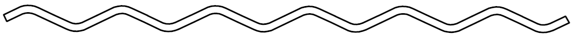
e) *Form E — Flat top crimp*



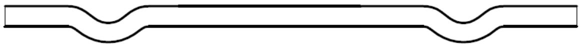
2.2.33 *Plain Wire* **—** Wire which has not been crimped or stamped prior to weaving.

2.2.34 *Plate Thickness* — Thickness of the plate before perforation.

2.2.35 *Precrimped Wire* — Wire, which has been crimped prior to weaving



2.2.36 *Prestamped Wire* — Wire, which has been stamped prior to weaving



2.2.37 *Punch Side* — Surface of a perforated plate from which the punch entered.

2.2.38 *Reciprocating Screen; Jigging Screen* — Screen or pair of screens to which a combined horizontal and vertical motion is imparted by a crank-shaft and connecting rods, the screening surfaces being horizontal or inclined at a small angle.

2.2.39 *Relieving Deck* — Screen, mounted above another screen, with apertures normally at least twice the size of those in the lower deck, used to reduce the load and wear of the lower screening surface.

2.2.40 *Resonance Screen* — Screen with a period of oscillation close to the natural period of oscillation of the resilient mounting.

2.2.41 *Revolving Screen; Trommel* — Screen in which the screening surface is formed into a cylinder or frustum of a cone, mounted on a horizontal or near-horizontal rotating shaft or on revolving rollers. The material to be screened is fed into the interior of the revolving screen.

2.2.42 *Rod Screen* — Screening surface consisting of parallel wire rods positioned at right angles to the flow of material on the screen.

2.2.43 *Roll Screen* — Screen consisting of a number of horizontal rotating shafts, fitted with elements arranged to provide screening apertures.

2.2.44 *Round Hole Equivalent* — The dimensions of the square apertures in a perforated plate or in a wire cloth which will screen similarly to a perforated plate with specified round or a woven wire screen respectively.

2.2.45 *Screen* — Device for carrying out the process of screening for industrial purposes.

NOTE — The term 'screen' is also a commonly used abbreviation for 'screening surface' or 'screen deck' (*see* **2.2.48**).

2.2.46 *Screen Opening* — The clear space between the wires, strands or threads.

2.2.47 *Screen Panel* — Finished piece of screening medium complete with edge preparation.

2.2.48 *Screening Surface; Screen Deck* — A sheet with regular openings of the same size in a regular arrangement for screening purposes (*see* **2.3.11**).

2.2.49 *Side Tensioning* — Tensioning of the screen section at right angles to the flow of the material on the screening surface.

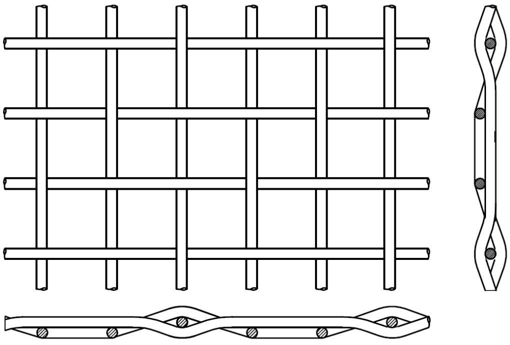
2.2.50 *Sieve Bend* — Device for screening fine particles suspended in liquid by means of a stationary curved panel, whereby the finer particles are removed from the bulk of the liquid in the underflow. It is also used as a first stage dewatering device.

2.2.51 *Sifter* — Type of screen having a rotary motion substantially in the plane of the screening surface, normally used for the screening of comparatively small particles, for example: less than 1 mm.

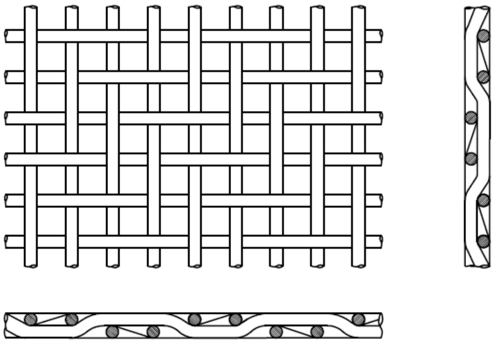
2.2.52 *Stroke; Throw* — Distance between the extreme positions of an oscillating motion. The stroke is equal to twice the amplitude.

2.2.53 *Twilled Weave* — Weave in which every warp wire crosses alternately above and below every second weft wire and vice versa. Following are the type of Twill weave (right or left lay):

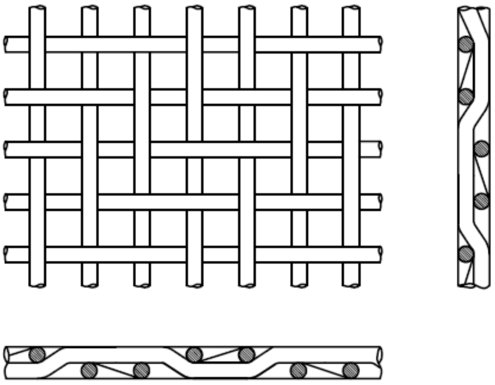
a) *Twill weave*, 3 *shaft, right lay*



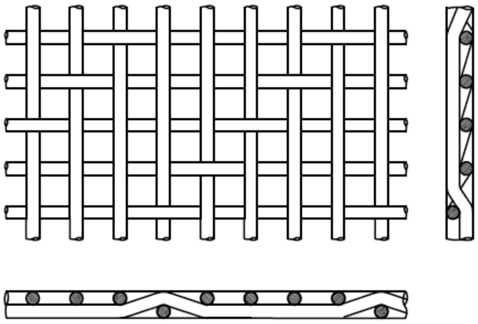
b) *Twill weave, 4 shaft, left lay*



c) *Herringbone twill*, 4 *shaft, twill weave with change*



d) *Satin weave*, 5 *shaft, right lay*



2.2.54 *Types of Holes* — Following are the types of holes in perforated plate:

a) *Round holes* (*R*) — Holes of circular shape;

b) *Squares holes* (*Q*) — Holes of square shape;

c) *Elongated holes* (*LR*) — Elongated holes with rounded ends;

d) *Hexagonal holes* (*H*) — Holes with six sides ; and

e) *Other holes* — All other holes are used for sieving only in special cases.

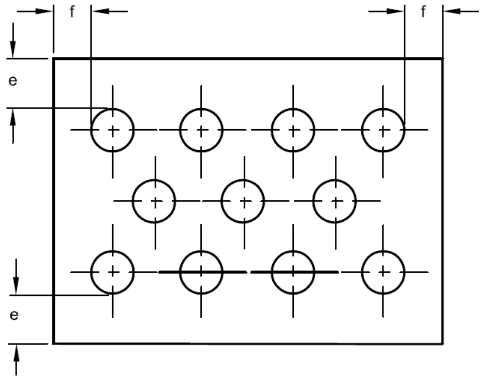
2.2.55 *Undersize Control Screen; Breakage Screen* — Screen used for the removal of undesirable undersize from a material.

2.2.56 *Unperforated Border/Margin* — Distance between two outside edges of the holes of the extreme row and the edge of the plate, measured perpendicular to the latter on punch entry side.

a) *For equal borders*

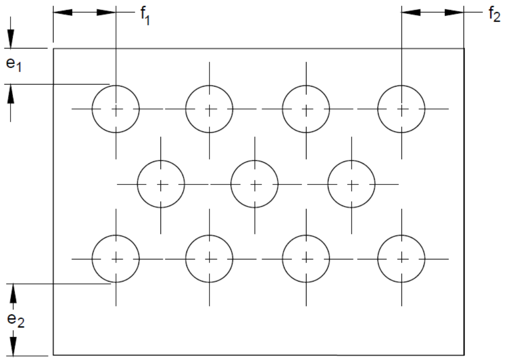
e = In the direction of the greater distance between the hole rows; and

f = In the direction of the smaller distance between the hole rows.



b) *For unequal borders*

e_1 = Smaller unperforated border;
e_2 = Bigger unperforated border;
f_1 = Smaller unperforated border; and
f_2 = Bigger unperforated border.



2.2.57 *Vibrating Screen* — Screen oscillated either by mechanical or by electrical means.

2.2.58 *Warp* (*k*) — All wires, strands or threads running parallel to the cloth selvedge.

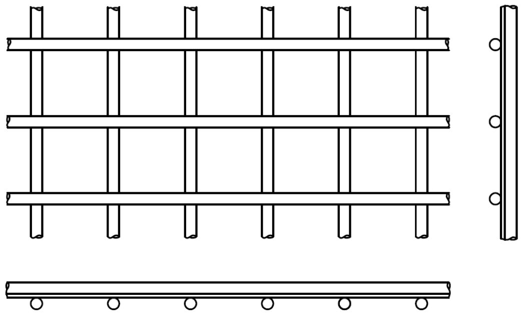
2.2.59 *Weave* — The way in which warp and weft wires cross each other.

2.2.60 *Wedge Wire Screen; Profile Wire Deck* — Screening surface of triangular or trapezoidal cross-section spaced from each other at a fixed dimension; the underflow thus passes through an aperture of increasing cross-section.

2.2.61 *Weft* (*s*) — All wires, strands or threads running at right angles to the cloth selvedge.

2.2.62 *Welded Mesh*

a) *Form F — Welded mesh*



2.2.63 *Wire Diameter* (*d, in Warp* $d_{k,}$ *in Weft* d_s) — Measured across the projected level of the finished cloth.

2.2.64 *Wire for Screens* — Single cored round, square or other forms of cross-section made out of metal or other synthetic material.

2.2.65 *Woven Wire Cloth; Wire Screen* — Screening surface, produced by a wire weaving process or by pressure-welding of two layers of parallel wires. The wires form square or rectangular apertures of uniform size. They may be precrimped before weaving.

NOTE — In English, flexible screening surfaces which can be rolled up are usually designated as 'woven wire cloth'. More rigid surfaces, predominantly made from precrimped wires and/or produced by pressure-welding, are designated as 'wire screen'.

2.3 The Screening Process

2.3.1 *Blinding*; *Clogging* — The condition where very fine particles adhere to a screening surface and reduce the apertures or close them completely.

2.3.2 *De-dusting; Polishing* — Removal of very fine particles from a feed by dry methods.

2.3.3 *De-sliming* — Removal of very fine particles from a feed by dry methods.

2.3.4 *Dewatering* — Removal of free water from solid material.

2.3.5 *Direction of Flow* — Direction in which the material is led over the screen. It is fixed by the method of working of the sieving arrangement.

2.3.6 *Dry Screening* — Screening without the aid of a liquid.

2.3.7 *Overflow* — That portion of the feed discharged from the screening surface without having passed through the apertures.

2.3.8 *Pegging* — The condition where particles wedge in the screen apertures.

2.3.9 *Rinsing* — Removal by spraying, usually with water, of fine or foreign material present among or adhering to larger particles.

2.3.10 *Scaling* — Removal of a small amount of the feed, usually unwanted oversize material.

2.3.11 *Screening* — Industrial process of separation of solid particulate material according to particle size by causing part to remain on a screening surface provided with apertures through which the remainder passes.

2.3.12 *Sizing* — Screening of particulate material into fractions, each defined by limits of size.

2.3.13 *Stratification* — Process whereby the larger size particles rise to the top of a bed of material being shaken or vibrated, while the smaller size particles sift through the voids and find their way to the bottom of the bed.

2.3.14 *Underflow* — That portion of the feed which has passed through the apertures of a screening surface.

2.3.15 *Wet Screening* — Screening with the aid of a liquid, usually in the form of a spray.

2.4 Products of Screening

2.4.1 *Mean Size* — The weighted average particle size of a sample, batch or consignment of particulate material.

2.4.2 *Near-Sized Material; Near-Mesh Material* — Particles approximating in size to the aperture size of the screening surface.

2.4.3 *Nominal Size* — The particle size used to describe a product of a sizing operation.

2.4.4 *Oversize* — Screened product of a size greater than a specified size.

2.4.5 *Product* — In general, the material resulting from any operation. In particular, the final material produced from a series of operations, for example: screened product, finished product, etc.

2.4.6 *Size Fraction* — The interval between two quoted limiting sizes of the material with particle sizes between those limits.

2.4.7 *Undersize* — Screened product of a size smaller than a specified size.

ANNEX A

(*Foreword*)

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Published by BIS, New Delhi